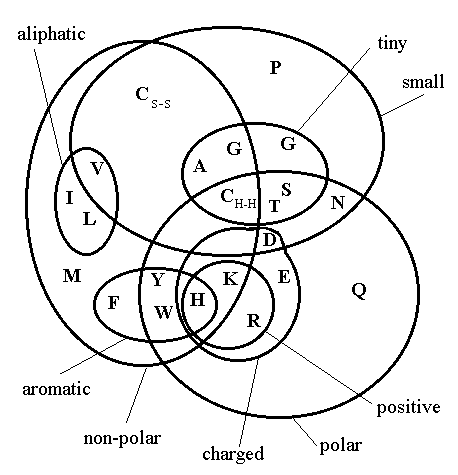
Knowledge Management & Learning System Project

Hand-in date: June 01, 2011

Viewing and modifying an ontology

Download the amino acid ontology available at:   
<http://www.co-ode.org/ontologies/amino-acid/2005/10/11/amino-acid.owl>

A classification of the 20 amino acids is available at:   
<http://prowl.rockefeller.edu/aainfo/chemprop.gif>

  
  
Look at the graph labeled "physio-chemical" on the left. Each amino acid is in one or more circles, depending on which class or classes it belongs to. A circle that is completely contained by another circle denotes a class that is a subclass of another (for example, the tiny amino acids are a subset of the small amino acids). Two circles that are completely disjoint denote two disjoint subclasses (for example, an acid might be either aromatic or aliphatic, but not both).

**Question 1 (5 points):**   
Click on the icon next to AminoAcid to show its subclasses and click on AliphaticAminoAcid. What are the properties of an aliphatic amino acid?

**Question 2 (5 points):**   
Look at the list of subclasses of AminoAcid. Do any of these subclasses look out of place compared to the others? Why?   
  
**Question 3 (10 points):**   
Suppose you wanted to know which of the 20 amino acids are aliphatic. How would you find out by viewing this ontology in Protege?   
  
**Question 4 (10 points):**   
Which classes that appear in the classification diagram in <http://prowl.rockefeller.edu/aainfo/chemprop.gif> are not listed as amino acid subclasses in the ontology?   
  
Right click on the subclass AromaticAmino acid and select "Add subclass". Select the H amino acid. Next right, click on the PositiveChargedAminoAcid, select "Add subclass", and select H again.   
  
**Question 5 (10 points):** Click on H and look at its asserted conditions in the window on the left. What are the inherited conditions? (listed at the bottom, below necessary conditions).   
  
**Question 6 (10 points):** Click on each of the two hasCharge Positive rows under asserted conditions and delete these two rows. Do the inherited conditions below change? Why or why not?   
  
**Ontology Modification (50 points):**   
  
Make at least two changes to the amino acid ontology to make it reflect the classification in the figure at <http://prowl.rockefeller.edu/aainfo/chemprop.gif>.   
Possible changes you can make include:   
-Adding amino acid subclasses that are not currently included as subclasses of amino acid. Make sure you add the appropriate property values as well.   
-Explicitly adding a subclass relationship between two classes.   
-Explicitly making two classes disjoint.   
-Querying amino acid subclasses that can search semantically the data and give reasonable well answers

-Display use of functional an inverse functional properties

-Display use of transitive and symmetric properties

-Display use of Asymmetric, reflexive and irreflexive properties

-Display property ranges and domains

-Describe and define classes along with property and existential references

-Using a reasoner to check inconsistent classes

-Describe necessary and sufficient conditions (primitive and defined classes)

-Apply universal restrictions

-Display value partitions and cardinality restrictions

Write a report describing the development of the complete program and changes you made and briefly justify your changes.